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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS

In re application of: MAZDA SALMANIAN	Group Art Unit: 2662
Serial No.: 09/383,629	Examiner: Dmitry Levitan
Filed: August 26, 1999	Attorney Docket: 77682-130
For: CALL ADMISSION CONTROL METHOD AND APPARATUS FOR CELLULAR SYSTEMS	

APPELLANT'S SUPPLEMENTAL BRIEF UNDER 37 C.F.R. 1.192

The Assistant Commissioner of Patents
Alexandria, V.A. 22313-1450
U.S.A.

Sir:

In response to the Office Action dated November 11, 2003, the following is the Appellant's Supplemental Brief, submitted in triplicate and under the provisions of 37 C.F.R. 1.192. Applicant requests reinstatement of the Appeal.

Real Party in Interest

The real party in interest is the assignee of record, i.e. Nortel Networks Limited, 2351 Boulevard Alfred-Nobel, St. Laurent, Quebec, Canada, H4S 2A9.

Related Appeals and Interferences

There are no related appeals or interferences that will directly affect, be directly affected by or have a bearing on the present appeal.

Status of Claims

The present appeal is directed to claims 1 to 14 and 18 to 20 found in the Appendix.

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Claim 17 was cancelled by the Amendment of January 2, 2003 (referred to hereinbelow as the First Amendment).

Claims 14, 15 and 16 were amended by the First Amendment and the Amendment of May 16, 2003.

Claims 5 to 9 and 11 to 13 are objected to in an Advisory Action which issued on June 10, 2003. The Examiner has indicated in the Office Action, that claims 5 to 9 and 11 to 13 would be allowed if re-written in independent form.

Status of Amendments

The Appellant filed an amendment on May 16, 2003 making a correction to claims 14, 15 and 16 in reply to the Final Office Action. An Advisory Action issued on June 10, 2003. No amendments have been made subsequent to May 16, 2003. The amendment of May 16, 2003 was not entered for the purpose of appeal. The Examiner did not provide a reason.

Summary of the Invention

As discussed on page 1, line 8 to page 2, line 2, of the present application, in cellular systems, each time a new session attempts to access the system, a decision as to whether or not to admit the session must be made. Methods for achieving this are commonly referred to as call admission control methods. Most conventional call admission control methods make this decision based upon system resources such as frequency usage. Others employ the use of metrics such as power control, signal-to-noise ratio, and a required quality of service of multiple services for example. Generally speaking, these methods have not been designed to deal with modern cellular systems in which many multimedia subscribers compete to access the air interface with different types of services which require specific qualities of services. Furthermore, conventional techniques do not predict what will happen if a particular session is admitted, but rather continue to admit sessions until quality drops to an unacceptable level for all the sessions. For example, when the average base station transmit power is used as a basis for admitting sessions, sessions are admitted until the transmit power is too high and quality goes down.

As discussed on page 2, lines 12 to 19, of the present invention, the present invention provides new methods and apparatuses for performing call admission control. In a first broad aspect, a method is provided for performing call admission control upon receipt of a request for a new session in which a FER (frame error rate) estimate is made of a new system FER which will result should the new session be admitted, and a decision as to whether or not to admit the new session is made on the basis of the new FER estimate. With reference to Figures 1, 2A, 2B, and 3, and page 9, line 1, to page 14, line 21, of the present application, the methods for performing admission control are described for two embodiments of the invention. In particular, with reference to Figure 2A and page 9, line 1, to page 10, line 16, of the present application, in one embodiment the new system FER comprises the sum of a cumulative estimate, FER_{cum}, of a current FER for all sessions which are currently in progress and an estimate of a FER degradation, FER_{deg}, is compared to a target FER, FER_{trgt}. If the sum is less than the target FER, then the session is admitted. Another embodiment is also discussed with reference to Figure 3 and page 10, line 24 to page 14, line 21 of the present application.

This first broad aspect of the invention is embodied in the appealed independent claims: method claim 1, apparatus claims 15, 16, and 18 and article of manufacture claim 19.

In a second broad aspect, a MAC (Media Access Control) layer implementation device is operable to execute the above method (see page 4, lines 14 to 25, and page 8, lines 3 to 25, of the present application).

This second broad aspect of the invention is embodied in the appealed independent device claim 14.

Issues

A first issue at appeal is whether, in paragraph 3 of the Final Action, the Examiner erred in rejecting claims 1 to 4, 10 and 19 to 20 under 35 U.S.C. 103(a) as being unpatentable over Scholefield (U.S. Patent No. 6,216,006, hereinafter "Scholefield") in view of Beming (U.S. Patent No. 5,740,537, hereinafter "Beming"), and similarly whether in paragraph 3 of the new action whether the Examiner erred in rejecting claims 1 to 4, 10, 14 to16 and 19 to 20 under 35 U.S.C. 103(a) as being unpatentable over Scholefield (U.S. Patent No.

6,216,006, hereinafter "Scholefield") in view of Beming (U.S. Patent No. 5,740,537, hereinafter "Beming").

Grouping of Claims

Respecting the first issue:

1. Each of independent method claim 1 and article of manufacture claim 19 is independently and separately patentable.

2. Each of dependent method claims 3 to 4 and 10 is separately and individually patentable.

3. Dependent article of manufacture claim 20 is separately and individually patentable.

4. None of claims 1, 3 to 4, 10, and 19 to 20 stand or fall together.

5. Claims 14 to 16 stand and fall together with claim 1.

Arguments

35 USC 103 Rejection of 1 to 4, 10, and 19 to 20

1. Independent Claim 1

In the Final Action, the Examiner has rejected claims 1 to 4, 10, and 19 to 20 under 35 U.S.C. 103(a) as being unpatentable over Scholefield in view of Beming. It is respectfully submitted that the Examiner's rejection of claim 1 is erroneous, for the following reasons.

Claim 1 recites:

"making an estimate of a new system FER which will result should the new session be admitted; and

deciding to admit or to deny the new session on the basis of the new system FER estimate."

In paragraph 6 of the Detailed Action of October 2, 2002 (referred to hereinbelow as

the First Action), the Examiner has argued that Scholefield teaches making an estimate of a new system QoS which will result if should a new session be admitted and refers to the "bandwidth" as the new system QoS (see page 4). The Examiner has agreed that Scholefield does not teach using frame error rates (FER) as a QoS determiner; however, the Examiner has stated that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to add using frame error rates (FER) as a QoS determiner of Beming to the system QoS of Scholefield to improve the system performance in interference environment" (see page 5). As will be shown below, the "bandwidth" does not equate to a new system QoS, and therefore the combination of the teachings of Scholefield and Beming is inappropriate.

In Scholefield, the amount of bandwidth that a call will require is determined, and then the existing bandwidth is examined to determine if the required bandwidth can be accommodated. In the First Amendment, it was argued that this is not the same as making an estimate of a new system QoS that will result if the new session is admitted. For example, suppose there are existing connections having a bandwidth totaling 80 Mbps on a channel having a capacity of 100 Mbps, and a request comes in to add a connection having a capacity of 15 Mbps. Using the method taught in Scholefield, the resulting capacity after adding the new connection will be 95 Mbps and as such the call would be admitted. No consideration is made as to what the new system quality of service might be. Simply determining a bandwidth occupied by a service has nothing to do with quality of service. It was also noted that, from the description, it can be seen that making an estimate of a new system QoS that will result if the new session is admitted does not equate to simple adding of an expected bandwidth to an existing bandwidth to determine a new total bandwidth.

In paragraph 4 (pages 5 and 6) of the Final Action, the Examiner disagrees with Applicant's argument that Scholefield does not teach using QoS at all in performance call admission, and states "Scholefield teaches using QoS with traffic descriptors as mean bit rate, peak bit rate and delay (col. 3 lines 9-22) and the effective bandwidth as the amount of bandwidth has to be reserved in order to meet the QoS requirements (col. 3 lines 23-25) to provide users with QoS levels (col. 2 lines 64-66)." As indicated above, the determination of the amount of bandwidth that a call will require, and then the examination of the existing

bandwidth to determine if the required bandwidth can be accommodated is not the same as making an estimate of a new system QoS that will result if the new session is admitted. Again, in such a case no consideration is made as to what the new system quality of service might be. Quality of service is some measure of quality associated with a signal. In construing Scholefield, the Examiner has equated QoS solely with bandwidth. Scholefield makes frequent references to both expressions but in distinctly different manners, and does not make this equivalence. Lines 14-19, Col. 3 of Scholefield specify the QoS to be traffic descriptors such as mean bit rate, the peak bit rate, and the requested delay. Using specified QoS parameters, the new estimated bandwidth is determined. If there is sufficient bandwidth, the call is admitted. In this way, simply determining a bandwidth occupied by a service as taught by Scholefield has nothing to do with quality of service -- This is simply a "binary" yes/no assessment. Rather, the bandwidth used is that required for the requested QoS. There is no concept of an unsatisfactory QoS – either the BW is available, or it is not. As such, although Scholefield makes use of the term QoS, this has nothing to do with making an estimate of a new system QoS.

Scholefield operates as per Fig. A below, while claim 1 operates as per Fig. C below.

FIG. A

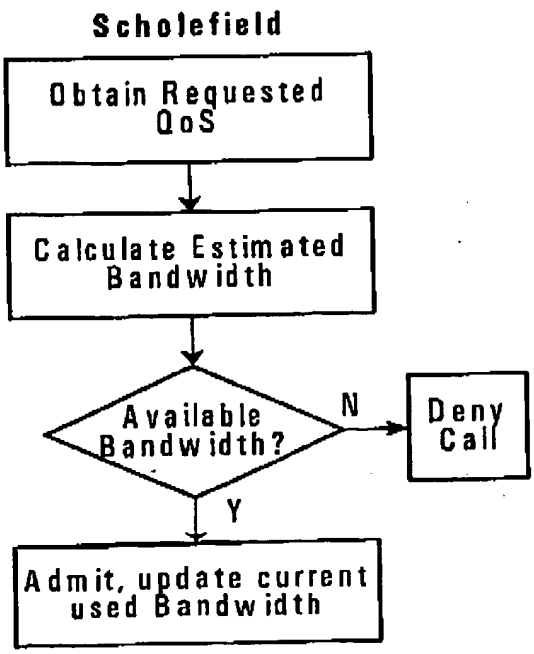


FIG. B

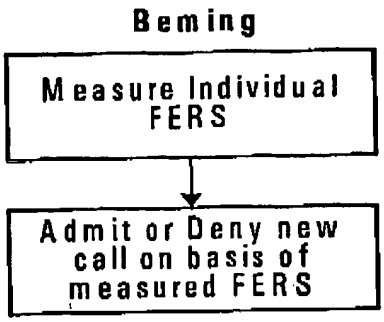
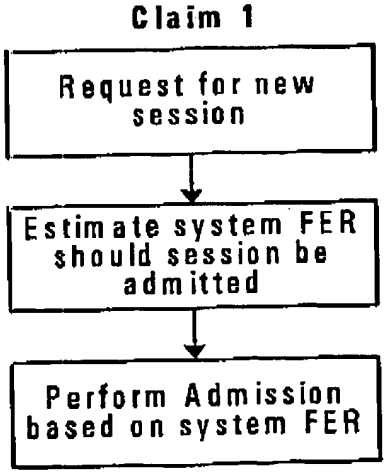


FIG. C



The Examiner has equated QoS and Bandwidth but the Appellant submits the telecom industry associates distinct and different meanings to these terms, and the above flowchart makes it clear these terms have distinct and different meanings. The QoS is an input to calculating an estimated bandwidth.

In the Final Action (page 5, last paragraph), the Examiner states "Scholefield, not Beming, does teach an estimate of new system QoS" and refers to Figure 3; col. 2 lines 64-67, col. 3 lines 1-8; and col. 3 lines 54-57. With respect, Appellant disagrees with this statement. In particular, Appellant submits that in col. 2 lines 64-67, col. 3 lines 1-8, and col. 3 lines 54-57, an admission decision is determined by whether there is enough surplus capacity on a wireless data network to accommodate an effective bandwidth of a service request. This is achieved by simply adding an expected bandwidth to an existing bandwidth to determine a new total bandwidth and as discussed in the First Amendment, this does not equate to the more complicated task of "making an estimate of a new system FER". Thus, with respect, it is submitted Scholefield does not teach making an estimate of a new system QoS.

Beming in any case does not teach a "system FER". Beming teaches that an FER for each wireless terminal may be employed to determine "levels of quality of ongoing communications". On the basis of this, the additional call admitted permits, or denies admission of additional communications in the communications system. Thus, Beming 1) does not teach a system FER, and 2) does not teach predictively determining a measure of QoS which should arise if a new call is admitted. Importantly, there is no FER prediction in Beming. Fig. B above summarizes Beming at least for the FER-based embodiment.

In the Final Action, the Examiner disagrees with the Applicant's argument that Scholefield and Beming teachings cannot operate in combination and states that "Scholefield teaches both steps of the Applicant method, but uses other than FER QoS determiners, Beming teaches FER as QoS determiner". Based on this argument the Examiner concludes that the method of Scholefield will work fine with FER as a QoS determiner. With respect, as discussed above Applicant submits that Scholefield does not teach the step of making an estimate of a new system QoS and therefore Applicant submits that the Examiner's argument is not well rounded. As indicated in the First Amendment, Scholefield teaches admitting

calls as a function of available bandwidth while Beming teaches admitting calls as a function of measured current frame error rates (note these are not system frame error rates as claimed in claim 1 either). Combining these two methods would result in a system in which calls are admitted only in the event that the bandwidth is available and the current frame error rates are acceptable, but this is not the claimed invention. There is nothing in the combination of the references which would teach any method of predicting a system frame error rate, or suggesting that such a predicted frame error rate would then be used in place of available bandwidth to perform a call admission. Thus, there is clearly no expectation of success in combining the two references and coming up with the claimed invention.

Thus, it is submitted that independent claim 1 patentably distinguishes over the above references. Claims 16, 17 and 18 depend directly on claims 1 and should be allowable for the same reasons presented previously.

2. Dependent Claims 3, 4, and 10

Claims 3, 4, and 10 depend directly or indirectly on claim 1 and as discussed in the First Amendment, further define the system frame error rate mechanism. As discussed above with reference to claim 1, none of the cited references teach system frame error rate. Applicant has invented an entirely new method of determining a system FER. In addition, in the Final Action, the Examiner has not addressed the arguments in favor of claims 3, 4, and 10 found in the First Amendment. Finally, claims 3, 4 and 10 further define the system frame error rate mechanism in separate ways which are not taught in either of the cited references and are therefore separately patentable from each other and from claim 1.

3. Independent Claim 19

Claim 19 is an article of manufacture claim with elements for carrying out each of the method steps of claim 1. Accordingly, the arguments set forth hereinabove in respect of claim 1 also apply in respect of claim 19. It is therefore submitted that claim 19 also patentably distinguishes over Scholefield and Beming. Furthermore, claim 19 is directed to an article of manufacture as opposed to a method and is therefore separately patentable form claim 1 and any of its dependent claims.

4. Dependent Claim 20

Claims 20 depends on claim 19 and, as discussed in the First Amendment (page 7), further defines the system frame error rate mechanism. As discussed above with reference to claim 1, none of the cited references teach system frame error rate. Applicant has invented an entirely new method of determining a system FER. In addition, in the Final Action, the Examiner has not addressed the arguments in favor of claim 20 found in the First Amendment. Finally, claims 20 further defines the system frame error rate mechanism in a way which is not taught in either of the cited references and Appellant submits it is separately patentable from claim 19.

Rejection of Claim 18

In the Office Action, which was mailed October 2, 2002, the Examiner rejected claim 18 under 35 U.S.C. 103(a). In the First Amendment, the Examiner's rejection of claim 18 under 35 U.S.C. 103(a) was addressed on pages 7 and 8 of the First Amendment. In the Office Action Summary of the Final Action, the Examiner has indicated claim 18 as being rejected; however, the Examiner has not addressed this rejection of claim 18 in the Final Action. The Examiner has not even stated under which United States code title claim 18 was being rejected. Claim 18 was again indicated as being rejected in the Advisory Action; however, claim 18 has not been rejected under any United States code title. Applicant submits that the Examiner's original 35 U.S.C 103(a) rejection to claim 18 found in the Office Action of October 2, 2002, has been addressed and there is no basis found in the Final Action or in the Advisory Action for rejecting claim 18. Furthermore, regarding claim 18, this is an apparatus claim again, which is very similar in scope to claim 1 and includes a processing element operable to make the above discussed frame error rate estimate of a new

system FER, and to decide whether or not to admit a new session on the basis of the new FER estimate. As discussed above respecting claim 1, this functionality is sufficient to patentably distinguish claim 18 over the cited references.

Respectfully submitted,

By _____

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RAB:MPP:acb:dmm:rld

APPENDIX

1. A method of performing call admission control upon receipt of a request for a new session comprising:

making an estimate of a new system FER which will result should the new session be admitted; and

deciding to admit or to deny the new session on the basis of the new system FER estimate.

2. A method according to claim 1 wherein making the estimate of the new system FER comprises:

making an estimate of a previous system FER at the time of the request;

determining an estimate of a degradation in the system FER should the new session be admitted; and

combining the estimate of the degradation to the estimate of the previous system FER to obtain said estimate of the total system FER.

3. A method according to claim 2 wherein making an estimate of a previous system FER at the time of the request comprises measuring the system FER

4. A method according to claim 2 wherein making an estimate of a previous system FER at the time of the request comprises:

starting with the previous system FER equal to an initial system FER;

each time a session is admitted, adding the degradation estimated for the session to the previous system FER; and

each time a session is ended, subtracting a degradation reduction for the session from the previous system FER.

5. A method according to claim 2 further comprising:

maintaining an expected degradation in the system FER as a function of how many sessions have been admitted;

wherein determining an estimate of a degradation in the system FER should the new session be admitted comprises:

maintaining a current count of how many sessions have been admitted; and

setting the estimate of the degradation in the system FER equal to the expected degradation for the current count.

6. A method according to claim 2 wherein the request for a new session identifies the session as having one of at least two different types, the method further comprising:

maintaining an expected degradation in the system FER as a function of how many sessions of each of said different types have been admitted;

wherein determining an estimate of the degradation in the system FER should the new session be admitted comprises:

maintaining a current count of how many sessions of each type have been admitted; and

setting the estimate of the degradation in the system FER equal to the expected degradation for the session's type and the type's current count.

7. A method according to claim 6 wherein maintaining an expected degradation in the system FER as a function of how many sessions of each of said different types have been admitted comprises:

generating test traffic with a predetermined ratio between numbers of sessions of each type; and

adding new sessions to the test traffic and making a measurement of the degradation in FER, and using these measurements as the expected degradations.

8. A method according to claim 6 further comprising:

identifying an initial value for the degradation in FER for the Nth session of each type;

each time an N+1th session of a particular type is admitted, making a measurement of the degradation which results; and

determining the expected degradation for the Nth session to be an average of up to K measurements for N+1th session admissions and the initial value for the Nth session if there are fewer than K measurements, where K is an integer greater than or equal to two.

9. A method according to claim 8 wherein identifying an initial value comprises:

generating test traffic with a predetermined ratio between numbers of sessions of each type; and

adding new sessions to the test traffic and making a measurement of the degradation in FER, and using these measurements as the initial values.

10. A method according to claim 1 wherein admitting or denying the new session on the basis of the new FER estimate comprises:

comparing the new FER estimate to a target FER, and if the new FER estimate exceeds the target FER denying the session, and if the new FER estimate does not exceed the target FER admitting the session.

11. A method according to claim 2 further comprising:

identifying an initial value for the degradation in FER for an Nth session admission;

making measurements of the degradation which results due to Nth session admissions; and

determining the expected degradation for the Nth session to be an average of up to K measurements for Nth session admissions and the initial value for the Nth session if

there are fewer than K measurements, where K is an integer greater than or equal to two.

12. A method according to claim 11 wherein one of said measurements of the degradation which results due to Nth session admissions is taken around the time an N+1th session admission occurs.

13. A method according to claim 11 wherein one of said measurements of the degradation which results due to Nth session admissions is taken before an N+1th session admission occurs and after the Nth session has been active for long enough for a meaningful measurement to be taken.

14. A MAC (media access control) layer implementation device operable to perform call admission control upon receipt of a request for a new session , the device comprising:

means for making an estimate of a new FER which will result should the new session be admitted, and

means for deciding to admit or to deny the new session on the basis of the new system FER estimate.

18. A call admission control apparatus comprising:

an input device operable to receive a request for a new session; and

a processing element operable to make a FER (frame error rate) estimate of a new system FER which will result should the new session be admitted and to decide whether to admit or to deny the new session on the basis of the new FER estimate.

19. An article of manufacture comprising:

a computer usable medium having computer readable code means embodied therein for performing call admission control, the computer readable code means in said article of manufacture comprising:

computer readable code means for making an estimate of a new system FER

which will result should a new session be admitted; and

computer readable code means for deciding to admit or to deny the new session on the basis of the new system FER estimate.

20. An article of manufacture according to claim 19 further comprising:

computer readable code means for making an estimate of a previous system FER at a time of the request;

computer readable code means for determining an estimate of a degradation in the system FER should the new session be admitted; and

computer readable code means for combining the estimate of the degradation to the estimate of the previous system FER to obtain said estimate of the total system FER.